EXHIBIT "A"

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Jokerst, *et al.*

Serial No.: 10/687,507

Filed: October 15, 2003

Confirmation No.: 9028

Group Art Unit: 2633

Examiner: Nguyen, Chau M.

Docket No. 62004-1211

For: **SYSTEM AND METHOD FOR BI-DIRECTIONAL OPTICAL COMMUNICATION USING STACKED EMITTERS AND DETECTORS**

DECLARATION OF NAN M. JOKERST

UNDER 37 C.F.R. 1.132

Commissioner for Patents
Alexandria, VA 22313-1450

Sir:

I, Nan M. Jokerst, declare as follows:

Education and Experience

1. I am the inventor of the above-identified patent application and a former employee of the assignee of that application.

2. I graduated with a B.S. in Physics in 1982 from Creighton University, then received a M.S.E.E. degree in Electrical Engineering in 1984 from the University of Southern California, followed by a Ph.D in Electrical Engineering in 1989 from the University of Southern California.

3. Since graduating with my doctoral degree, I was a tenure track faculty member at Georgia Tech from 1989-2003 (ending with an Endowed Professorship), and then moved to Duke University, to become the J. A. Jones Distinguished Professor in Electrical and Computer Engineering. My research from 1983 to the present has focused on manufacturable, low cost nanosystem and microsystem integration of photonic, electronic (analog, digital, RF), plasmonic, chemical, and biological active components. Bonding of thin film semiconductor (GaAs, InP and GaN-based, Si) material and devices onto host substrates such as Si, GaAs, polymers, Si CMOS circuits, and electronic interconnection substrates has been demonstrated by my group by separating thin film single crystal devices (either electrical or optical) from their lattice matched growth or bonded substrate with subsequent bonding of the thin film devices onto a host substrate. I have published and presented over 200 papers and three book chapters on these topics, and I am considered a leader in the field of thin film devices and heterogeneously integrated systems using thin film devices. Current projects utilizing this technology include embedded optoelectronic interconnections in electrical interconnection substrates, alignment tolerant optoelectronic links for micro to long haul interconnections, three dimensional electrical and optical integration of Si circuits for massively parallel processing and interconnect, new integrated emitter, detector, transmitter, and receiver designs, alignment tolerant optoelectronic substrate and fiber optic interconnect, and integrated chip-scale sensing systems.

4. Through my education and research work in the electronics industry, I have gained extensive experience with thin film technology.

The Tsuji et al. Reference (USPN 5,664,035, herein Tsuji)

5. The Patent Examiner who is responsible for examining the above-noted patent application had the following comments to make in Section 5 of the Detailed Action in the Office Action mailed 3/24/2005:

> Regarding claims 1 and 6, referring to Figures 1, 2b, and 4b, Tsuji discloses a bidirectional optical link (Fig. 1), comprising: a thin film detector (221), (Fig. 1) having an upper surface facing a predetermined direction to receive incident light; and a thin film emitter (222) (Fig. 1) stacked over the upper surface and oriented to direct a beam of light toward the predetermined direction (see col. 4, lines 36-46 and col. 5, lines 4-62).

6. Relevant cited portions of *Tsuji*, as well as additional lines 63-64 of column 5, provide as follows (emphasis added):

> [col. 5, lines 50-67] ***Light receiver 221*** of integrated O-E and E-O converter 22 may include, for example, a ***compound semiconductor thin film*** containing gallium arsenide (GaAs), silicon (Si), etc. It is preferable to use gallium arsenide thin film which exhibits a higher rate of energy conversion at thinner film thicknesses than silicon. (See, T. Imai, "Compound Semiconductor Device", Kogyou Chosakai Publishing Co. Ltd., 1985, pp 314-315.)
> ***Semiconductor compounds*** of the III-V group including gallium arsenide are preferably used for light sources. Silicon is preferably used for light receivers and light receiver arrays. This combination imposes difficulties in forming a light source, a light receiver and a light receiver array on one ***substrate***.

7. From the cited sections of *Tsuji*, it appears that the Office Action equates a receiver to a detector and emitter, and also appears to equate a thin film of a semiconductor compound to thin film devices (*i.e.*, emitter and detector) as used in my claims 1-13.

8. The cited sections reproduced above clearly refer to a ***light receiver*** of an integrated O-E and E-O converter, which is not the same as a thin film emitter or thin film

detector.

9. The light receiver described in *Tsuji* is described as including a ***compound semiconductor thin film***, which is not a thin film device (*i.e.*, thin film emitter or thin film detector).

Thin film devices

10. Upon information and belief, I submit that one skilled in the art of thin film technology, such as myself, would understand that thin film technology generally includes devices having a thickness ranging typically between 0.1 and 10 microns thick, and in some circumstances, up to 30 to 50 microns thick.

11. Upon information and belief, I submit that one skilled in the art of thin film technology, such as myself, would understand that in thin film technology, the native, or growth, substrate is removed.

12. Upon information and belief, I submit that one skilled in the art of thin film technology, such as myself, would understand that by removing the native or growth substrate, such as in thin film technology, fabrication is generally simpler and the optically absorbing portion (*i.e.*, the substrate) is removed.

Thin film devices versus Tsuji

13. Upon information and belief, I submit that one skilled in the art of thin film technology, such as myself, would understand that the thin film described in *Tsuji* refers to a thin film of material of a compound semiconductor that may comprise a substrate, as suggested in line 64 of col. 5 in *Tsuji*, or a portion of a device.

14. Upon information and belief, I submit that one skilled in the art of thin film technology, such as myself, would understand that compound semiconductor structures, which generally have a total thickness of approximately 350-500 microns, and the use of the thin film in the compound semiconductor structure, are not the same as a thin film device (*i.e.*, thin film emitter or thin film detector).

15. Based on the foregoing, and upon information and belief, I submit that one skilled in the art of thin film technology, such as myself, would understand that the thin film in *Tsuji* is not the same as the thin film emitter and thin film detector as described in my claims 1-13.

<u>**DECLARATION**</u>

I hereby declare that all statements made herein are of my own knowledge are true and that all statements are made on information and belief and are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Nan Marie Jokerst

6/23/2005

Nan M. Jokerst **Date**